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### Claims

1. A method for manufacturing a fiber web, in particular a web of tissue or hygiene material, provided with a three-dimensional surface structure in which the fiber web is pressed at a dry content of <25% onto an imprinting band by means of a first pressure field and is thereby pre-imprinted and is subsequently once more pressed onto an imprinting band by means of a further pressure field for further dewatering and drying in order to fix the three-dimensional surface structure and strength.
2. A method in accordance with claim 1, characterized in that an imprinting screen is used as the imprinting band.
3. A method in accordance with claim 1, characterized in that an imprinting membrane is used as the imprinting band.
4. A method in accordance with any one of the preceding claims, characterized in that the fiber web is pre-imprinted downstream of the forming region.
5. A method in accordance with any one of the preceding claims, characterized in that the fiber web is formed on the imprinting band used for imprinting.

6. A method in accordance with any one of the preceding claims, characterized in that the fiber web is transferred onto the imprinting band used for pre-imprinting.
7. A method in accordance with any one of the preceding claims, characterized in that the same imprinting band is used for pre-imprinting and for fixing the surface structure.
8. A method in accordance with any one of the preceding claims, characterized in that at least the first pressure field is produced by means of a suction element arranged at the side of the imprinting band remote from the fiber web to suck the fiber web into the surface structure of the imprinting band.
9. A method in accordance with claim 8, characterized in that a wet suction box is used as the suction element.
10. A method in accordance with any one of the preceding claims, characterized in that the fiber web is pressed gently in the further pressure field, i.e. preferably over a stretch extended in the web running direction.
11. A method in accordance with any one of the preceding claims, characterized in that the further pressure field is produced by means of a press nip.
12. A method in accordance with claim 11, characterized in that the press nip forming the further pressure field is produced between a dryer cylinder and an opposing element, with the fiber web guided

through the press nip being in contact with the surface of the dryer cylinder and contacting the imprinting band with its other side.

13. A method in accordance with claim 12, characterized in that a Yankee cylinder is used as the dryer cylinder.
14. A method in accordance with claim 12 or claim 13, characterized in that a shoe press unit is used as the opposing element interacting with the dryer cylinder and includes a flexible band guided via a press shoe in the region of the press nip.
15. A method in accordance with claim 14, characterized in that a shoe pressing roll provided with a flexible roll jacket is used as the shoe press unit.
16. A method in accordance with claim 12 or claim 13, characterized in that a pressing roll or a suction pressing roll is used as the opposing element interacting with the dryer cylinder.
17. A method in accordance with any one of the preceding claims, characterized in that the pre-imprinted fiber web is dried on the dryer cylinder; in that the fiber web is creped and/or in that the fiber web is subsequently wound up.
18. A method in accordance with any one of the preceding claims, characterized in that the dry content at which the fiber web is pre-imprinted and/or the dry content at which the three-dimensional surface structure is fixed is respectively selected at <25%, in particular <15%, and preferably <10%.

19. A method in accordance with any one of the preceding claims, characterized in that a suction device is used between the suction element producing the first pressure field and the press nip producing the further pressure field; and in that the fiber web is guided together with an imprinting band both over the suction device and through the press nip.
20. A method in accordance with claim 19, characterized in that the suction device has a curved surface and the fiber web and the imprinting band are guided over this curved area.
21. A method in accordance with claim 20, characterized in that a suction roll is used as the suction device.
22. A method in accordance with any one of the preceding claims, characterized in that a hood standing under overpressure is associated with the suction device to support the underpressure action of the suction device.
23. A method in accordance with any one of the preceding claims, characterized in that the length of the press nip of the shoe press including the dryer cylinder and the shoe press unit observed in the web running direction is selected to be larger than a value of approximately 80 mm and the shoe press is designed such that a pressure profile results over the press nip length with a maximum pressing pressure which is smaller than or equal to a value of approximately 2.5 MPa.

24. A method in accordance with any one of the preceding claims, characterized in that at least one dewatering screen with a zonally different screen permeability is used in the forming region.
25. A method in accordance with claim 24, characterized in that a former is used with two circulating dewatering bands which run together while forming a pulp run-in gap and are guided over a forming element such as in particular a forming roll; and in that a dewatering screen with a zonally different screen permeability is used as an outer band not coming into contact with the forming element and/or as an inner band.
26. A method in accordance with claim 25, characterized in that an imprinting band is used as the inner band and a dewatering screen with zonally different screen permeability is preferably used as the outer band.
27. A method in accordance with claim 26, characterized in that the fiber web is preferably taken over from the inner band by an imprinting band.
28. A method in accordance with any one of the preceding claims, characterized in that an imprinting band, e.g. an imprinting screen or an imprinting membrane, is guided through the press nip and is structured such that for this imprinting band a smaller areal proportion of raised or closed zones results in comparison with the areal proportion of recessed zones or holes and correspondingly a smaller areal proportion of the fiber web is pressed in the press nip.

29. A method in accordance with claim 28, characterized in that an imprinting band is used in which the areal proportion of raised or closed zones is  $\leq 40\%$  and preferably lies in a range from approximately 20% to approximately 30%, and in particular at approximately 25%.
30. A method in accordance with claim 28 or claim 29, characterized in that an imprinting band is used in which the raised zones and the recessed zones result from offsets, i.e. from intersection points of picks and ends, of a screen fabric.
31. A method in accordance with any one of the preceding claims, characterized in that at least one felt with a foamed layer is used for dewatering the web.
32. A method in accordance with claim 31, characterized in that the foam coating is selected such that pores results in a range from approximately 3 to approximately 6  $\mu\text{m}$ .
33. A method in accordance with any one of claims 1 to 30, characterized in that a so-called spectra membrane is used for dewatering the web, with this spectra membrane preferably being used together with a conventional, in particular a woven, screen.
34. A method in accordance with any one of claims 1 to 30, characterized in that a so-called anti-rewetting membrane is used for dewatering the web.

35. A method in accordance with claim 34, characterized in that the anti-rewetting membrane is used together with a conventional, in particular a woven, screen.
36. A method in accordance with claim 34, characterized in that the anti-rewetting membrane is used without an additional screen or the like.
37. A method in accordance with any one of the preceding claims, characterized in that a clothing, e.g. a screen, felt with a foamed layer, a spectra membrane preferably together with a conventional, in particular woven, screen or an anti-rewetting membrane with or without a conventional, in particular woven, screen, is guided together with an imprinting band and a fiber web interposed therebetween about at least one suction roll, with the clothing preferably being in contact with the suction roll.
38. A method in accordance with any one of claims 31 to 37, characterized in that the clothing with a foamed layer, spectra membrane preferably together with a conventional, in particular woven, screen or an anti-rewetting membrane with or without a conventional, in particular woven, screen, wraps a suction roll with a diameter from approximately 2 to approximately 3 m or a plurality of suction rolls with smaller diameters, preferably two suction rolls with a diameter from, for example, approximately 2 m in each case.
39. A method in accordance with any one of claims 31 to 38, characterized in that the suction roll has a vacuum applied to its lower side.

40. A method in accordance with any one of claims 31 to 38, characterized in that a suction roll with an associated siphon extractor is used or the water is spun into a channel by centrifugal force.
41. A method in accordance with any one of the preceding claims, characterized in that the water is blown off by means of an air knife.
42. A method in accordance with any one of the preceding claims, characterized in that, to drive out water by means of gas pressure, the fiber web is guided together with an imprinting band at least once, and preferably twice, through a pressure space which is bounded by at least four rolls arranged in parallel and into which a compressed gas is led.
43. A method in accordance with claim 42, characterized in that the fiber web is guided together with the imprinting band between membranes through the pressure space, with preferably an air distribution membrane and an anti-rewetting membrane being used.
44. A method in accordance with any one of the preceding claims, characterized in that the thickness of the imprinting membrane amounts to approximately 1 to approximately 3 mm and/or in that the open area of this imprinting membrane is larger than 50%, and expediently larger than 60%, and preferably lies in a range from approximately 70% to approximately 75%.
45. A method for dewatering a fiber web, in particular a web of tissue or hygiene material, characterized in that, to drive out water by means



of gas pressure, the fiber web is guided together with an imprinting band at least once, and preferably twice, through a pressure space which is bounded by at least four rolls arranged in parallel and into which a compressed gas is led and in that the fiber web is guided together with the imprinting band between membranes through the pressure space, with preferably an air distribution membrane and an anti-rewetting membrane being used.

46. An apparatus (10) for manufacturing a fiber web (12), in particular a web of tissue or hygiene material, provided with a three-dimensional surface structure in which the fiber web (12) is pressed at a dry content of <25% onto an imprinting band (14) by means of a first pressure field (I) and is thereby pre-imprinted and is subsequently once more pressed onto an imprinting band (14) by means of a further pressure field (II) for further dewatering and drying in order to fix the three-dimensional surface structure and strength.
47. An apparatus in accordance with claim 46, characterized in that an imprinting screen is provided as the imprinting band (14).
48. An apparatus in accordance with claim 46, characterized in that an imprinting membrane is provided as the imprinting band (14).
49. An apparatus in accordance with claim 47 or claim 48, characterized in that the fiber web (12) is imprinted downstream of the forming region.

50. An apparatus in accordance with any one of the preceding claims, characterized in that the fiber web (12) is formed on the imprinting band (14) used for imprinting.
51. An apparatus in accordance with any one of the preceding claims, characterized in that the fiber web (12) is transferred onto the imprinting band (14) used for pre-imprinting.
52. An apparatus in accordance with any one of the preceding claims, characterized in that the same imprinting band (14) is provided for pre-imprinting and for fixing the surface structure.
53. An apparatus in accordance with any one of the preceding claims, characterized in that at least the first pressure field (I) is produced by means of a suction element (16) arranged at the side of the imprinting band (14) remote from the fiber web (12) to suck the fiber web (12) into the surface structure of the imprinting band (14).
54. An apparatus in accordance with claim 53, characterized in that a wet suction box is provided as the suction element (14).
55. An apparatus in accordance with any one of the preceding claims, characterized in that the fiber web (12) is pressed gently in the further pressure field (II), i.e. preferably over a stretch extended in the web running direction (L).
56. An apparatus in accordance with any one of the preceding claims, characterized in that the further pressure field (II) is produced by means of a press nip (18).

57. An apparatus in accordance with claim 56, characterized in that the press nip (18) forming the further pressure field (II) is provided between a dryer cylinder (20) and an opposing element (22), with the fiber web (12) guided through the press nip (18) being in contact with the surface (20') of the dryer cylinder (20) and contacting the imprinting band with its other side.
58. An apparatus in accordance with claim 57, characterized in that a Yankee cylinder is provided as the dryer cylinder (20).
59. An apparatus in accordance with claim 57 or claim 58, characterized in that a shoe press unit is provided as the opposing element (22) interacting with the dryer cylinder (20) and includes a flexible band (26) guided via a press shoe (24) in the region of the press nip (18).
60. An apparatus in accordance with claim 59, characterized in that a shoe pressing roll provided with a flexible roll jacket (26) is provided as the shoe press unit.
61. An apparatus in accordance with claim 57 or claim 58, characterized in that a suction press roll with a soft liner and/or a low pressing pressure is provided as the opposing element (22) interacting with the dryer cylinder (20).
62. An apparatus in accordance with claim 57 or claim 58, characterized in that a pressing roll or suction pressing roll is provided as the opposing element (22) interacting with the dryer cylinder (20).

63. An apparatus in accordance with any one of the preceding claims, characterized in that means are provided to dry the pre-imprinted fiber web (12) on the dryer cylinder (20), to crepe the fiber web and/or to subsequently wind up the fiber web (12).
64. An apparatus in accordance with any one of the preceding claims, characterized in that the dry content at which the fiber web (12) is pre-imprinted and/or the dry content at which the three-dimensional surface structure is fixed, is in each case <25%, in particular <15%, and preferably <10%.
65. An apparatus in accordance with any one of the preceding claims, characterized in that a suction device (30) is provided between the suction element (16) producing the first pressure field (I) and the press nip (18) producing the further pressure field (II); and in that the fiber web (12) is guided together with an imprinting band (14) both over the suction device and through the press nip (18).
66. An apparatus in accordance with claim 65, characterized in that the suction device (30) has a curved surface and the fiber web (12) and the imprinting band (14) are guided over this curved surface.
67. An apparatus in accordance with claim 66, characterized in that a suction roll is provided as the suction device (30).
68. An apparatus in accordance with any one of the preceding claims, characterized in that a hood standing under overpressure is associated with the suction device (30) to support the underpressure effect of the suction device (30).

69. An apparatus in accordance with any one of the preceding claims, characterized in that the length of the press nip (18) of the shoe press including the dryer cylinder (20) and the shoe press unit (22) observed in the web running direction (L) is larger than a value of approximately 80 mm and the shoe press is designed such that a pressure profile results over the press nip length with a maximum pressing pressure which is smaller than or equal to a value of approximately 2.5 MPa.
70. An apparatus in accordance with any one of the preceding claims, characterized in that at least one dewatering screen (42, 54) with zonally different screen permeability is provided in the forming region.
71. An apparatus in accordance with claim 70, characterized in that a former with two circulating dewatering bands (14, 42) is provided, which run together while forming a pulp run-in gap (44) and are guided over a forming element (46) such as in particular a forming roll; and in that a dewatering screen with zonally different screen permeability is provided as an outer band (42) not coming into contact with the forming element (46) and/or as an inner band (54).
72. An apparatus in accordance with claim 71, characterized in that an imprinting band (14) is provided as the inner band and a dewatering screen with zonally different screen permeability is preferably provided as an outer band (42).
73. An apparatus in accordance with claim 71, characterized in that the fiber web (12) is preferably taken over from the inner band (54) by an imprinting band.

74. An apparatus in accordance with any one of the preceding claims, characterized in that an imprinting band (14), e.g. an imprinting screen or imprinting membrane, is guided through the press nip (18) and is structured such that for this imprinting band (14) a smaller areal proportion of raised or closed zones (68) results in comparison with the areal proportion of recessed zones or holes and a smaller areal proportion of the fabric web (12) is correspondingly pressed in the press nip (18).
75. An apparatus in accordance with claim 74, characterized in that an imprinting band (14) is provided in which the areal proportion of raised or closed zones (68) is  $\leq 40\%$  and preferably lies in a range from approximately 20% to approximately 30% and in particular at approximately 25%.
76. An apparatus in accordance with claim 74 or 75, characterized in that an imprinting band (14) is provided in which the raised zones (68) and the recessed zones result from offsets, i.e. from intersection points of picks and ends, of a screen fabric.
77. An apparatus in accordance with any one of the preceding claims, characterized in that at least one felt (36) with a foamed layer is provided for dewatering the web (12).
78. An apparatus in accordance with claim 77, characterized in that the foam coating is selected such that pores result in a range from approximately 3 to approximately 6  $\mu\text{m}$ .

79. An apparatus in accordance with any one of claims 46 to 76, characterized in that a so-called spectra membrane is provided for dewatering the web, with this spectra membrane preferably being provided together with a conventional, in particular a woven, screen.
80. An apparatus in accordance with any one of claims 46 to 76, characterized in that a so-called anti-rewetting membrane is provided for dewatering the web.
81. An apparatus in accordance with claim 80, characterized in that the anti-rewetting membrane is provided together with a conventional, in particular woven, screen.
82. An apparatus in accordance with claim 80, characterized in that the anti-rewetting membrane is provided without an additional screen or the like.
83. An apparatus in accordance with any one of the preceding claims, characterized in that a clothing (36), e.g. a screen, a felt with a foamed layer, a spectra membrane preferably together with a conventional, in particular a woven, screen or an anti-rewetting membrane with or without a conventional, in particular woven, screen, is guided together with an imprinting band (14) and a fiber web (12) interposed therebetween about a suction roll (38), with the clothing (36) preferably being in contact with the suction role (38).
84. An apparatus in accordance with any one of claims 77 to 83, characterized in that the clothing (36) with a foamed layer, a spectra membrane preferably together with a conventional, in particular

woven, screen, or an anti-rewetting membrane with or without a conventional, in particular woven screen, overcasts a suction roll (38) with a diameter of approximately 2 to approximately 3 m, or a plurality of suction rolls with smaller diameters, preferably two suction rolls with a diameter of, for example, approximately 2 m in each case.

85. An apparatus in accordance with any one of claims 77 to 83, characterized in that the suction roll (38) can have a vacuum applied to its underside.
86. An apparatus in accordance with any one of claims 77 to 84, characterized in that a suction roll (38) with an associated siphon extractor is provided or the water is spun into a groove by centrifugal force.
87. An apparatus in accordance with any one of the preceding claims, characterized in that an air knife is provided for blowing off water.
88. An apparatus in accordance with any one of the preceding claims, characterized in that, to drive out water by means of gas pressure, the fiber web (12) is guided together with an imprinting band (14) at least once and preferably twice through a pressure space (58) which is bounded by at least four rolls (60-66) arranged in parallel and into which a compressed gas can be led.
89. An apparatus in accordance with claim 88, characterized in that the fiber web (12) is guided together with the imprinting band (14) and between membranes (72, 36) through the pressure space (58), with



preferably an air distribution membrane (72) and an anti-rewetting membrane (36) being provided.

90. An apparatus in accordance with any one of the preceding claims, characterized in that the thickness of the imprinting membrane amounts to approximately 1 to approximately 3 mm and/or in that the open area of this imprinting membrane is larger than 50%, and expediently larger than 60%, and preferably lies in a range from approximately 70% to approximately 75%.
91. An apparatus for dewatering a fiber web, in particular a web of tissue or hygiene material, characterized in that, to drive out water by means of gas pressure, the fiber web (12) is guided together with an imprinting band (14) at least once, and preferably twice, through a pressure space (58) which is bounded by at least four rolls (60-66) arranged in parallel and into which a compressed gas can be led and in that the fiber web (12) is guided together with the imprinting band (14) between membranes (72, 36) through the pressure space, with preferably an air distribution membrane (72) and an anti-rewetting membrane (36) being provided.